AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-10 (Canceled)

11. (New) An image optical system in which a plurality of light beams emerging from an image-forming device on a conjugate plane A and having a divergence angle of 10° or greater is made obliquely incident upon a conjugate plane B to form on the conjugate plane B an enlarged image approximately similar to an image formed by the image-forming device, said image optical system comprising:

a first optical system and a second optical system,

the first optical system including a plurality of refracting optical elements having a common optical axis and having the function of converging the plurality of light beams emerging from the image-forming device on both of a first light beam cross section parallel to principal rays and a second light beam cross section intersecting the first light beam cross section,

the second optical system including a reflecting optical element having a free-form surface and having the function of converging light beams passing through the first optical system on the conjugate plane B,

the first optical system having a first reference axis passing through a position nearer to a light beam traveling through the shortest optical path from the conjugate plane A to the conjugate plane B than to a light beam traveling through the longest optical path from the conjugate plane A to the conjugate plane B, the first reference axis being perpendicular to the conjugate plane A,

the second optical system having a second reference axis passing through a position nearer to a light beam traveling through the shortest optical path from the conjugate plane A to the conjugate plane B than to a light beam traveling through the longest optical path from the conjugate plane A to the conjugate plane B, the second reference axis being perpendicular to the conjugate plane B,

wherein if the distance from the point of emergence on the first optical system to the point of incidence on the second optical system along the first reference axis is S1 and the distance from the point of emergence on the second optical system to the conjugate plane B along the second reference axis is S2;

if the maximum and minimum of the distance between a point of convergence in the first and second light beam cross sections of a light beam emerging from the first optical system at a point nearest to the first reference axis and the point of emergence on the first optical system are L11 and L21, respectively;

if the maximum and minimum of the distance between the point of convergence in the first and second light beam cross sections of a light beam emerging from the first optical system at a point remotest from the first reference axis and the point of emergence on the first optical system are L1n and L2n,

conditions expressed by

$S1 \leq L11 \leq S1 + S2$

$S1 \leq L21 \leq S1 + S2$

$L11/L1n < 0.25$

$0 < L21/L2n < 1.5$

are satisfied.

12. (New) An image optical system in which a plurality of light beams emerging from an image-forming device on a conjugate plane A and having a divergence angle of 10° or greater is made obliquely incident upon a conjugate plane B to form on the conjugate plane B an enlarged image approximately similar to an image formed by the image-forming device, said image optical system comprising:

a first optical system and a second optical system,

the first optical system including a plurality of refracting optical elements having a common

optical axis and having the function of converging the plurality of light beams emerging from the image-forming device on both of a first light beam cross section parallel to principal rays and a second light beam cross section intersecting the first light beam cross section,

the second optical system including a reflecting optical element having a free-form surface and having the function of converging light beams passing through the first optical system on the conjugate plane B,

the first optical system having a first reference axis passing through a position nearer to a light beam traveling through the shortest optical path from the conjugate plane A to the conjugate plane B than to a light beam traveling through the longest optical path from the conjugate plane A to the conjugate plane B, the first reference axis being perpendicular to the conjugate plane A,

the second optical system having a second reference axis passing through a position nearer to a light beam traveling through the shortest optical path from the conjugate plane A to the conjugate plane B than to a light beam traveling through the longest optical path from the conjugate plane A to the conjugate plane B, the second reference axis being perpendicular to the conjugate plane B,

wherein if the distance from the point of emergence on the first optical system to the point of incidence on the second optical system along the first reference axis is S1 and the distance from the point of emergence on the second optical system to the conjugate plane B along the second reference axis is S2;

if the maximum and minimum of the distance between a point of convergence in the first and second light beam cross sections of a light beam emerging from the first optical system at a point nearest to the first reference axis and the point of emergence on the first optical system are L11 and L21, respectively;

if the maximum and minimum of the distance between the point of convergence in the first and second light beam cross sections of a light beam emerging from the first optical system at a point remotest from the first reference axis and the point of emergence on the first optical system are L1n and L2n, respectively;

if the distance along an arbitrary light beam from the first optical system to the second

optical system is D1 and the distance along the arbitrary light beam from the second optical system to the conjugate plane B is D2,

conditions expressed by

$S1 \leq L11 \leq S1 + S2$

$S1 \leq L21 \leq S1 + S2$

$L11/L1n < 0.25$

$0 < L21/L2n < 1.5$

$D1 < D2$

are satisfied.

13. (New) An image optical system in which a plurality of light beams emerging from an image-forming device on a conjugate plane A and having a divergence angle of 10° or greater is made obliquely incident upon a conjugate plane B to form on the conjugate plane B an enlarged image approximately similar to an image formed by the image-forming device, said image optical system comprising:

a first optical system and a second optical system,

the first optical system including a plurality of refracting optical elements having a common optical axis and having the function of converging the plurality of light beams emerging from the image-forming device on both of a first light beam cross section parallel to principal rays and a second light beam cross section intersecting the first light beam cross section,

the second optical system including a reflecting optical element having a free-form surface and having the function of converging light beams passing through the first optical system on the conjugate plane B,

the first optical system having a first reference axis passing through a position nearer to a light beam traveling through the shortest optical path from the conjugate plane A to the conjugate plane B than to a light beam traveling through the longest optical path from the conjugate plane A

to the conjugate plane B, the first reference axis being perpendicular to the conjugate plane A,

the second optical system having a second reference axis passing through a position nearer to a light beam traveling through the shortest optical path from the conjugate plane A to the conjugate plane B than to a light beam traveling through the longest optical path from the conjugate plane A to the conjugate plane B, the second reference axis being perpendicular to the conjugate plane B,

wherein if the distance from the point of emergence on the first optical system to the point of incidence on the second optical system along the first reference axis is S1 and the distance from the point of emergence on the second optical system to the conjugate plane B along the second reference axis is S2;

if the maximum and minimum of the distance between a point of convergence in the first and second light beam cross sections of a light beam emerging from the first optical system at a point nearest to the first reference axis and the point of emergence on the first optical system are L11 and L21, respectively;

if the maximum and minimum of the distance between the point of convergence in the first and second light beam cross sections of a light beam emerging from the first optical system at a point remotest from the first reference axis and the point of emergence on the first optical system are L1n and L2n, respectively;

if the difference between the maximum and minimum of the ratio S1/L1 of the distance L1 and the distance Sl is ΔSL,

conditions expressed by

$$Sl \leq L11 \leq Sl + S2$$

$$Sl \leq L21 \leq Sl + S2$$

$$L11/L1n < 0.25$$

$$0 < L21/L2n < 1.5$$

are satisfied and at least one of conditions expressed by

$$Sl/L11 > 0.6$$

$(Sl + S2)/L2n < 1$

$\Delta SL > 0.6$

is further satisfied.

14. (New) An image optical system in which a plurality of light beams emerging from an image-forming device on a conjugate plane A and having a divergence angle of 10° or greater is made obliquely incident upon a conjugate plane B to form on the conjugate plane B an enlarged image approximately similar to an image formed by the image-forming device, said image optical system comprising:

a first optical system and a second optical system,

the first optical system including a plurality of refracting optical elements having a common optical axis and having the function of converging the plurality of light beams emerging from the image-forming device on both of a first light beam cross section parallel to principal rays and a second light beam cross section intersecting the first light beam cross section,

the second optical system including a reflecting optical element having a free-form surface and having the function of converging light beams passing through the first optical system on the conjugate plane B,

the first optical system having a first reference axis passing through a position nearer to a light beam traveling through the shortest optical path from the conjugate plane A to the conjugate plane B than to a light beam traveling through the longest optical path from the conjugate plane A to the conjugate plane B, the first reference axis being perpendicular to the conjugate plane A,

the second optical system having a second reference axis passing through a position nearer to a light beam traveling through the shortest optical path from the conjugate plane A to the conjugate plane B than to a light beam traveling through the longest optical path from the conjugate plane A to the conjugate plane B, the second reference axis being perpendicular to the conjugate plane B,

wherein if the distance from the point of emergence on the first optical system to the point of incidence on the second optical system along the first reference axis is S1 and the distance from

the point of emergence on the second optical system to the conjugate plane B along the second reference axis is S2;

if the maximum and minimum of the distance between a point of convergence in the first and second light beam cross sections of a light beam emerging from the first optical system at a point nearest to the first reference axis and the point of emergence on the first optical system are L11 and L21, respectively;

if the maximum and minimum of the distance between the point of convergence in the first and second light beam cross sections of a light beam emerging from the first optical system at a point remotest from the first reference axis and the point of emergence on the first optical system are L1n and L2n, respectively;

if the distance along an arbitrary light beam from the first optical system to the second optical system is D1 and the distance along the arbitrary light beam from the second optical system to the conjugate plane B is D2; and

if the difference between the maximum and minimum of the ratio S1/L1 of the distance L1 and the distance S1 is ΔSL,

conditions expressed by

$S1 \leq L11 \leq S1 + S2$

$S1 \leq L21 \leq S1 + S2$

$L11/L1n < 0.25$

$0 < L21/L2n < 1.5$

$D1 < D2$

are satisfied and at least one of conditions expressed by

$S1/L11 > 0.6$

$(S1 + S2)/L2n < 1$

$\Delta SL > 0.6$

is further satisfied.